

## WINDS.

The prevailing winds have been northwest in the Middle and Eastern States, northeast in southern Florida, southeast in the Southwest, and southwest or northwest in the remaining sections of the country, as detailed on Chart No. II.

(1) The total movement of the wind has been, as usual, least at sheltered positions on the eastern side of the Appalachian range. The highest record of the month is 11,600 at Long Branch and Erie; other records are as follows: Indianola, 9,985; Peck's Beach, 9,847; Cheyenne, 9,057; New York, 9,060; Rochester, 9,375; Cape Henry, 9,077. The lowest are Lynchburg, 3,121; Augusta, 3,282; Nashville, 3,416; Shreveport, 3,569; Memphis, 3,880; Portland, Oregon, 2,178; San Diego, Cal., 3,130.

## VERIFICATIONS.

(1) The detailed comparison of published Probabilities with the succeeding weather shows an average percentage of verifications of 83 per cent; the range being from 79 in the lower Missouri valley to 87 in New England.

(2) The reports of Signal Service observers at their respective stations show that, of 149 signals displayed at 28 stations on the Atlantic and Gulf coasts, 13 have not yet been heard from, 67 have been verified at the stations themselves, 40 not so verified and 29 were too late, while 11 occasions have been noted on which signals would have been justifiable if ordered. On the Lakes the display of signals has not yet been resumed.

## NAVIGATION.

The maximum and minimum heights of water in the rivers are noted in the table on Chart No. III. Special interest attaches to the serious interruption, by ice, of the navigation, both in the interior and along the coasts from Cape Henry to Nova Scotia. The record of the thickness of ice on the coast, as well as on the fresh-water lakes and rivers, will give some indication of the severity of the season.

(1.) *Fresh-water ice.*—The thickness of ice is reported, in inches, as follows: Nebraska—Missouri river, 25 to 27; Penn., pond ice, 16, under eight inches of snow; river ice, 18 to 24, and at Williamsport, 30; small creeks solid. N. J.—Trenton, ice 24; Freehold, 8. Vt.—Lake Champlain, 18; pond ice, 31 to 48. N. H.—Dumbarton, 16; creeks solid. N. Y.—Lockport canal, 22; Seneca Lake, 6, entirely across. Va.—Alexandria, Potomac river, 10 and 12. Wis.—Milwaukee, Lake Michigan, 24.

(2.) *Ocean water.*—N. Y. City, 12 to 16; Sandy Hook, N. Y., 15 at shore, 5 at five hundred yards off shore. N. J.—Squan Beach, 3. Conn.—New Haven, 20 to 26. Maine.—Penobscot Bay to Machias Bay, 10 to 12, and in retired creek, 30.

(3.) *Obstruction of navigation.*—From special reports in answer to an official circular, it appears that the first inconvenience from ice was felt at New York bay, January 15th, continuing to February 25th, and proving the most severe obstruction since 1847. Ice-floes of one or two square miles surface, and packs or hummocks twenty feet high were quite common. The movements of the ice in this region were regulated principally by the tides, unless the hourly wind velocity exceeded twelve miles. In Long Island Sound heavy floes and packs were sometimes five or six feet thick and three or four miles in diameter, and harbors were closed for two and three weeks. On the coast of Maine, from Penobscot to Machias bays the ice was almost unbroken for fifteen miles off shore, but Eastport harbor was unobstructed. Baltimore was harbor nearly blocked up, and heavy ice-drift reported at Cape Henry.

**Cape Cod.**—A fleet of fifteen or more vessels were frozen in during the latter half of the month.

Harbors and rivers were first freed from ice on the following dates: 22d, Sandy Hook; Louisville, Ky., (closed sixteen days;) 23d, Detroit, Mich.; Dutch Island, R. I.; New Haven, Conn., (closed fourteen days,) Newport, R. I.; 24th, Pittsburgh, Penn., Washington, D. C.; 25th, Morgantown, W. Va.; Tarentum, Penn., (closed fifty-three days,) New York bay; 26th, Springfield, Mass., St. Louis, Mo.

## TEMPERATURE OF WATER.

The maximum and minimum temperatures of the water are given in the table on Chart No. II. The temperatures of the bottom water have been on the average above that of the air for the following stations: *Atlantic and Gulf stations.*—Eastport, 15°; Portland, 10°; Wood's Hole, 7°; New London, 7°; New York, 4°.5; Jacksonville, 4°; Punta Rassa, 6°; Mobile, 0°.5. *River stations.*—Pittsburgh, 12°.5; Louisville, 6°; Knoxville, 7°.5; Nashville, 3°.5; St. Louis, 6°; Cairo, 4°.

The average temperature of the air and bottom water has been sensibly the same at Wilmington, Augusta, Charleston and Key West.

The water temperatures have been lower than the air at Savannah, 1°; Memphis, 1°.5; Shreveport, 1°; Galveston, 1°, and Indianola, 1°. Throughout the month the water from New Jersey to Nova Scotia has been from 28 to 34° in temperature.

## ATMOSPHERIC ELECTRICITY.

(1) *Thunder Storms.*—Storms accompanied by electricity, with hail, prevailed very widely on the 23d, 24th and 25th. The general distribution of the storms for the month is shown by the fact that they occurred on the 2d, in Ga., Tenn., Ala. and Ind.; 3d, in Ga. and Tenn.; 10th, Ala. and La.; 11th, Ga.; 19th, La.; 20th, Kan.; 22d, Kan. and La.; 23d, Ala., Ga., Ill., Ind., Iowa, Kan., Ky., Mich., Mo., Neb., N. C., Tenn. and Wis.; 24th, Ala., Ga., Ill., Ind., Ky., Me., Mich., N. Y., N. C., Ohio, Penn., S. C., Tenn. and Va.; 25th, Ala., Ga., Mass., N. C., Tenn. and Va.; 28th, Ill., Ind., Kan., Mo. and Tenn.

(2) *Auroras.*—The principal auroras of the month were those of the 26th and 28th. The former, as seen at stations in the West, was more finely developed than as seen in New England; it was observed over an unusually large area. In detail, auroras were visible as follows: On the 3d, in Tex.; 6th, N. Y.; 7th, Me., Minn., N. Y., Vt., and Mich.; 9th, N. J.; 14th, Mo.; 18th, Vt.; 24th, Conn. and Me.; 25th, N. Y. and Va.; 26th, Me., Vt., N. H., Mass., Conn., N. Y., N. J., Penn., Del., Md., Va., W. Va., Can., Fla., Tenn., Mich., Ind., Ill., Wis., Minn., Iowa, Neb. and Kan.; 27th, Iowa, Ill., Md., N. Y., N. J., Va. and Tex.; 28th, Me., Vt., N. Y., Conn., R. I., Mass., Tenn. and Ind.

## OPTICAL PHENOMENA.

(1) *Solar Halos.*—The record of solar halos for this month is unusually large, even for so cold a month; they were observed as follows: 1st, Mass. and Ala.; 2d, N. Y., Ga., Conn., Mass., Del., N. H. and Pa.; 3d, Minn., Ala., Ill., Ind., Iowa, Kan., Mass., Mo., Neb. and Va.; 4th, Col., Tex., Mich., Iowa, Ind., Ill. and Ala.; 5th, Ala., Ind., Neb., N. Y. and Wis.; 6th, Ill., Ind., Iowa, Kan., Neb., N. H., Ohio, N. H., Tenn. and Wis.; 7th, Mass., Minn., Conn., Ill., Me., N. H., N. Y., Pa. and Wis.; 8th, Ind., Tex., Ill., Me., Mass., Mich., N. H., N. Y., Pa. and Vt.; 9th, Ga., Ill., Ind., Me., Mass., Mich., N. Y. and Wis.; 10th, Neb., N. Y., Pa. and Va.; 11th, Minn., Ill., Ind., Iowa, Neb. and Wis.; 12th, N. M., Del., Me., Mich., N. J., N. Y., Ohio and Wis.; 13th, Mass., Mich. and N. Y.; 14th, Mass. and N. M.; 15th, Ind., N. H. and N. Y.; 16th, Minn., Col. and Mich.; 17th, Mass., Ind., Iowa, Kan., Mich., Neb., N. Y. and Ohio; 18th, Mass., N. Y., D. C., Ill., Ind., Mich., Pa. and Wis.; 19th, Me., N. H. and N. Y.; 20th, Iowa; 21st, D. C., Pa., N. J., Mich. and Wis.; 22d, Ala., Neb., N. H., N. Y. and Wis.; 23d, Mass., Pa., W. Va., Conn., Del., Md., N. H., N. Y. and Wis.; 24th, Iowa, Kan., Me., Neb. and Wis.; 25th, Neb.; 26th, Iowa, Neb. and Ohio; 28th, Ala., Ga., Tenn. and Va.